

18. **PHYSOSPERMOPSIS** H. Wolff, Notizbl. Bot. Gart. Berlin-Dahlem 9: 276. 1925.

滇芎属 dian xiong shu

Pan Zehui (潘泽惠); Mark F. Watson

*Haploseseli* H. Wolff & Handel-Mazzetti.

Herbs perennial, glabrous. Taproot usually long, conic. Stem ribbed, base covered with fibrous sheath remnants. Leaf blade obovate-lanceolate, broadly triangular to oblong, 1–2-pinnate, rarely entire. Umbels terminal and lateral; bracts many, prominent, leaf-like, base entire, apex 3-lobed or pinnate; bracteoles present, entire or 3-lobed to pinnate. Calyx teeth minute or inconspicuous. Petals obovate, white, yellowish or dark purple, base shortly claw-like, apex obtuse-rounded or with shortly inflexed tips. Stylopodium flattened, margin sinuate; styles about as long as stylopodium. Fruit ovoid to broadly ovoid, base slightly cordate, apex gradually narrowed, slightly flattened laterally, young fruits usually emerald green; ribs 5, filiform, prominent; vittae 2–3 in each furrow, 2–4 on commissure. Seed face plane to concave. Carpophore parted at apex.

About ten species: Sino-Himalayan region; eight species (four endemic) in China.

This is a taxonomically complex genus in which species boundaries are not always clear, and generic limits (e.g., with *Pleurospermum*, *Tongoloo*, and *Trachydium*) are problematic. *Physospermopsis* is one of a group of high-altitude Sino-Himalayan genera in need of a revision treating all taxa across their whole geographic range.

- 1a. Basal leaves simple, undivided ..... 1. *P. alepidioides*
- 1b. Basal leaves 1–2-pinnate or 1–2-ternate/pinnate.
  - 2a. Plants 5–10 cm high; stems reduced, often acaulescent ..... 2. *P. kingdon-wardii*
  - 2b. Plants above 20 cm high; stems not reduced.
    - 3a. Bracts usually absent; bracteoles inconspicuous ..... 3. *P. cuneata*
    - 3b. Bracts and bracteoles present, conspicuous.
      - 4a. Base of leaf segments decurrent, rachis broadly winged ..... 4. *P. delavayi*
      - 4b. Base of leaf segments not decurrent, rachis not broadly winged.
        - 5a. Basal leaves pinnate, nerves partly purple-red ..... 5. *P. rubrinervis*
        - 5b. Basal leaves 2-pinnate, nerves not purple-red.
          - 6a. Bracts entire, 3–5-lobed or nearly-pinnate ..... 6. *P. muliensis*
          - 6b. Bracts 2-pinnate, as the leaves.
            - 7a. Leaf sheaths broad-membranous; bracteoles narrowly obovate, apex incised into 3 teeth or pinnatifid; fruit ribs plane ..... 7. *P. shaniana*
            - 7b. Leaf sheaths small, not broad-membranous; bracteoles broadly obovate, apex incised into 7–9 teeth; fruit ribs sinuate ..... 8. *P. obtusiuscula*

1. **Physospermopsis alepidioides** (H. Wolff & Handel-Mazzetti) R. H. Shan, Sinensia 12: 185. 1941.

全叶滇芎 quan ye dian xiong

*Haploseseli alepidioides* H. Wolff & Handel-Mazzetti, Symb. Sin. 7: 722. 1933.

Plants 40–70 cm. Stem branched. Basal petioles 4–10 cm, narrowly winged, sheaths narrow; leaf blade obovate or obovate-lanceolate, ca. 8 × 2–3 cm, simple, base cuneate, margin sparsely serrate. Umbel to 12 cm across; peduncles 15–25 cm, scabrous; bracts 4–7, lanceolate or oblong, 5–15 mm, apex 2–3-lobed, margin dark purple; rays 6–13, 2.5–8.5 cm, unequal; bracteoles several, ovate-lanceolate, 2–3.5 × 1–1.5 mm, entire or 2–3-lobed at apex; pedicels 2–4 mm. Calyx teeth minute, ovate-triangular, ca. 0.2 mm. Petals broadly elliptic to obovate, white, 1.5–1.8 mm, apex obtuse. Young fruit ovoid, ca. 2 × 1.8 mm, lateral furrows wider than the dorsal; ribs prominent, somewhat verrucose; vittae 3 in each furrow, 4 on commissure. Seed face plane. Fl. and fr. Jul–Oct.

- Open forests, grasslands; 2200–3300 m. SW Sichuan.

This unusual, poorly known taxon is recorded only from a few

collections.

2. **Physospermopsis kingdon-wardii** (H. Wolff) C. Norman, J. Bot. 76: 231. 1938.

小滇芎 xiao dian xiong

*Trachydium kingdon-wardii* H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 124. 1929; *Physospermopsis bhutanensis* Farille & S. B. Malla; *Pleurospermum kingdon-wardii* (H. Wolff) M. Hiroe.

Plants 5–10 cm. Root long-conic, 2–8 cm. Stem shortened, sometimes to 10 cm, often acaulescent. Basal petioles 2–6 cm, sheaths ovate; blade ovate-oblong in outline, 2–4 × 1.5–2 cm, pinnate; pinnae 2–4 pairs, pinnatifid; ultimate segments lanceolate or oblanceolate, 4–7 × 1–2 mm, entire or 2–3-lobed. Umbels terminal, 3–10 cm across; peduncles (0–)2–4 cm; bracts 1–5, 2–3 cm; rays 5–12(–20), ribbed, 1–10(–13) cm, unequal, often spreading; bracteoles 2–5, lanceolate, nearly as long as flowers; umbellules 8–14 mm across, 10–25-flowered; pedicels unequal. Calyx teeth minute, triangular. Petals white, yellowish or blue-purple, ca. 1 × 0.8 mm. Fruit broadly ovoid; ribs prominent, often sinuate, immature fruit sometimes with sparse mi-

nute warts; vittae 2–3 in each furrow, 4–6 on commissure. Seed face slightly concave. Fl. Jul–Sep, fr. Aug–Nov.

Forests, grassy meadows, damp marshes; 2700–4800 m. SE Xizang, NW Yunnan [Bhutan, Nepal, Sikkim].

The distinction between this and other dwarf, high-altitude species in the Himalayan region is a continuing problem; see also *Pleurospermum nanum* and *Trachydium*.

**3. *Physospermopsis cuneata*** H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 126. 1929.

楔叶滇芎 xie ye dian xiong

*Sinodielsia cuneata* (H. Wolff) Pimenov & Kljuykov.

Plants 30–40 cm. Root stout, long-conic. Stem slender, ribbed, a little branched above. Basal petioles 6–15 cm, flattened, sheaths short, narrow; blade broadly rhombic-ovate in outline, ternate/pinnate; pinnae 3-parted; ultimate segments oblong, 8–15 × 2–5 mm, apex 2–5-lobed, base cuneate, slightly decurrent. Umbels terminal, ca. 2–4.5 cm across; peduncles 5–10 cm; bracts often absent, rarely 1, ovate, 1–1.2 cm; rays 5–6, slender, 2–4 cm, unequal; bracteoles 4–6, linear, shorter than pedicels; umbellules 8–15-flowered. Calyx teeth triangular-ovate, to 0.5 mm. Petals white, ca. 1.3 × 1 mm, midvein conspicuous, apex obtuse. Young fruit broadly ovoid, ca. 2 × 2 mm, mature fruit unknown. Fl. and fr. Oct–Dec.

• Open grasslands; 3300–3400 m. Sichuan, Yunnan.

This species is unusual within the genus by the lack of conspicuous bracts and bracteoles. However, it is a poorly known taxon, recorded only from a few collections. The generic assignment is therefore tentative pending further study, as the species may be better placed in *Tongolooa* or, if recognized, *Sinodielsia*.

**4. *Physospermopsis delavayi*** (Franchet) H. Wolff, Notizbl. Bot. Gart. Berlin-Dahlem 9: 278. 1925.

滇芎 dian xiong

*Arracacia delavayi* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 115. 1894; *Pleurospermum delavayi* (Franchet) M. Hiroe.

Plants 55–75 cm. Root stout, long-conic. Stem branched above. Basal petioles 4–7.5 cm, winged, sheaths narrow-oblong; blade triangular or ovate-oblong in outline, 3.5–8 × 2.5–6.5 cm, pinnate/pinnatifid, rachis conspicuously winged; ultimate segments obovate to obovate-orbicular, 2–3 × 1–2.5 cm, base decurrent, margin incised-serrate, often 3-lobed, the central lobe larger than the laterals. Leaves reduced upwards. Umbels 1.5–8 cm across; peduncles 7–20 cm; bracts 4–5, leaf-like, 7–13 mm, apex usually 2–3-lobed, purple-green; rays 5–11, 1–5.5 cm; bracteoles 3–4, ovate-lanceolate or oblanceolate, 4–6 × ca. 2 mm, entire or 3-lobed; umbellules 6–12 mm across, 7–14-flowered; pedicels 3–5 mm. Calyx teeth suborbicular or ovate-triangular, ca. 0.2 mm. Petals white, 2–2.2 mm. Fruit broadly ovoid, 2–3.5 × 2.5–4 mm; ribs filiform, somewhat sinuate; vittae 2 in each dorsal furrow, 3 in each lateral furrow, 4 on commissure. Seed face concave. Fl. May–Aug, fr. Jul–Sep.

• Open grasslands; 2800–3900 m. Sichuan, Yunnan.

**5. *Physospermopsis rubrinervis*** (Franchet) C. Norman, J. Bot. 76: 231. 1938.

紫脉滇芎 zi mai dian xiong

*Trachydium rubrinerve* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 112. 1894; *Physospermopsis muktinathensis* Farille & S. B. Malla; *Pleurospermum rubrinerve* (Franchet) M. Hiroe.

Plants 35–50 cm. Root stout, long-conic. Stem dark purple, little branched above. Basal petioles 5.5–9 cm, sheaths ovate and membranous; blade ovate to broadly ovate in outline, 3.5–5 × 3–4 cm, pinnate; ultimate segments ovate or rhombic, 1.5–2.5 × 1–1.5 cm, base cuneate, margin coarsely incised-toothed or lobed, nerves partly purple-red. Leaves reduced upwards. Umbels 5–15 cm across; peduncles 6–23 cm; bracts 2–5, obovate-lanceolate, leaf-like, apex pinnate; rays 9–14, unequal; bracteoles 3–4, margin purple-red, nearly as long as flowers; umbellules 9–25-flowered, pedicels 2–4 mm. Calyx teeth small, triangular. Petals white, margin purple-red, ca. 0.8 mm. Fruit broadly ovoid, ca. 3 × 3 mm. Seed face concave. Fl. and fr. Aug–Oct.

Open grasslands; 3200–4800 m. SW Sichuan, Yunnan [NE India, Nepal].

**6. *Physospermopsis muliensis*** R. H. Shan & S. L. Liou in R. H. Shan & M. L. Sheh, Fl. Reipubl. Popularis Sin. 55(1): 297. 1979.

木里滇芎 mu li dian xiong

Plants 20–30 cm. Root long-conic. Stem branched. Basal and lower petioles 5–9 cm, narrowly winged, sheaths narrow; blade ovate-oblong in outline, 3–4 × 2.5–3 cm, 2-pinnate/pinnatifid; pinnae 3–5 pairs, ovate to long-ovate, 1–2 × 0.7–1 cm, margin pinnatisect. Leaves reduced upwards. Umbels 3–8 cm across; peduncle 10–15 cm; bracts 5–6, 1.5–2 × 0.2–0.7 cm, leaf-like, entire or apex 2–3-toothed to somewhat pinnatifid; rays 10–15, up to 5 cm, unequal; bracteoles 3–4, lanceolate, nearly as long as pedicels, entire, rarely 2–3-toothed; umbellules 9–20-flowered. Calyx teeth minute. Petals white. Fruit broadly ovoid or ovoid, 1.5–2 × 1.8–2 mm, ribs filiform, sparse scattered warts, especially on ribs; vittae 3 in each furrow, 4 on commissure. Seed face plane. Fl. and Fr. Sep–Oct.

• Open grasslands; 3100–4000 m. SW Sichuan, NW Yunnan.

**7. *Physospermopsis shaniana*** C. Y. Wu & F. T. Pu in W. T. Wang & S. G. Wu, Vasc. Pl. Hengduan Mts. 1: 1285. 1993.

丽江滇芎 li jiang dian xiong

*Trachydium forrestii* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 291. 1912; *Physospermopsis dielsii* Pimenov & Kljuykov, nom. illeg. superfl.; *P. forrestii* (Diels) C. Norman (1938), not Fedde ex H. Wolff (1929); *Pleurospermum forrestii* (Diels) M. Hiroe.

Plants 15–30 cm. Taproot long-conic. Stem reduced, branched at base, branches longer than the main stem. Basal petioles 4–9 cm, sheaths broad; blade ovate-oblong in outline, 3–5 × 2–3.5 cm, 2-pinnate/pinnatifid; pinnae sessile, 3–5 pairs, ovate or broad-ovate, 1.5–2 × 1–1.5 cm, margin pinnatifid; ultimate segments entire or 2–3-toothed. Leaves reduced upwards. Umbels 2–13 cm across; peduncles 7–16 cm; bracts 3–5, leaf-like, 2-pinnate, apex pinnate; rays 9–13, (1–)3–7 cm, ascending-spreading; bracteoles 2–5, ovate oblong to ovate-

lanceolate, as long as or exceeding the flowers, often 3-toothed; pedicels 9–13. Calyx teeth minute. Petals white, 1.2–1.5 × 1–

1.2 mm. Fruit broadly ovoid, 2.5–3.5 × 2–2.5 mm, base truncate or slightly cordate. Seed face concave. Fl. and fr. Jul–Aug.

Grassy slopes; 2900–4500 m. Sichuan, Xizang, Yunnan [Myanmar].

**8. *Physospermopsis obtusiuscula*** (Wallich ex de Candolle) C. Norman, *J. Bot.* 76: 231. 1938.

波棱滇芎 bo leng dian xiong

*Hymenolaena obtusiuscula* Wallich ex de Candolle, *Prodr.* 4: 246. 1830; *Physospermopsis farillei* P. K. Mukherjee & Constance; *P. hirsutula* (C. B. Clarke) Farille; *Pleurospermum obtusiusculum* (Wallich ex de Candolle) M. Hiroe; *Trachydium hirsutulum* C. B. Clarke; *T. obtusiusculum* (Wallich ex de Candolle) C. B. Clarke; *T. obtusiusculum* var. *strictum* C. B. Clarke.

Plants 15–45 cm, sometimes flushed red. Root short, thickened. Stem dark purple-green, simple, occasionally branched at base. Leaves petiolate; petioles 3–4 cm, sheaths small; blade ovate in outline, 4–5 cm, 2-pinnate; pinnae ovate, ca. 1.5 cm, margin pinnatifid; ultimate segments narrowly elliptic, 2–3 × 1–2 mm. Primary umbels 5–18 cm across; peduncles 9–18 cm; bracts 4–6, leaf-like, 2-pinnate; rays purple, 14–17, 2.5–14 cm, unequal, becoming erect in fruit; bracteoles 3–4, broadly obovate, slightly longer than flowers, 6–9-toothed at apex; umbellules 7–12-flowered. Calyx teeth minute. Fruit ovoid to broadly ovoid, 2.5–3.2 × 1.5–1.8 mm; ribs narrowly winged, sinuate; vittae 2 in each furrow, 4 on commissure. Seed face plane. Fl. and fr. Aug–Sep.

Forests, grasslands; 3900–4300 m. Sichuan, Xizang, Yunnan [Bhutan, NE India, Nepal, Sikkim].

This is a widespread species with complex morphological variation. Distinction between this species and *Physospermopsis shaniana* is not always straightforward.

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